

TITLE: INTEGRATED CIRCUIT PACKAGES WITH SANDWICHED CAPACITORS (AS AMENDED)
INVENTOR NAME: Priyavaran R. Patel et al.
SERIAL NO.: 10/006,292

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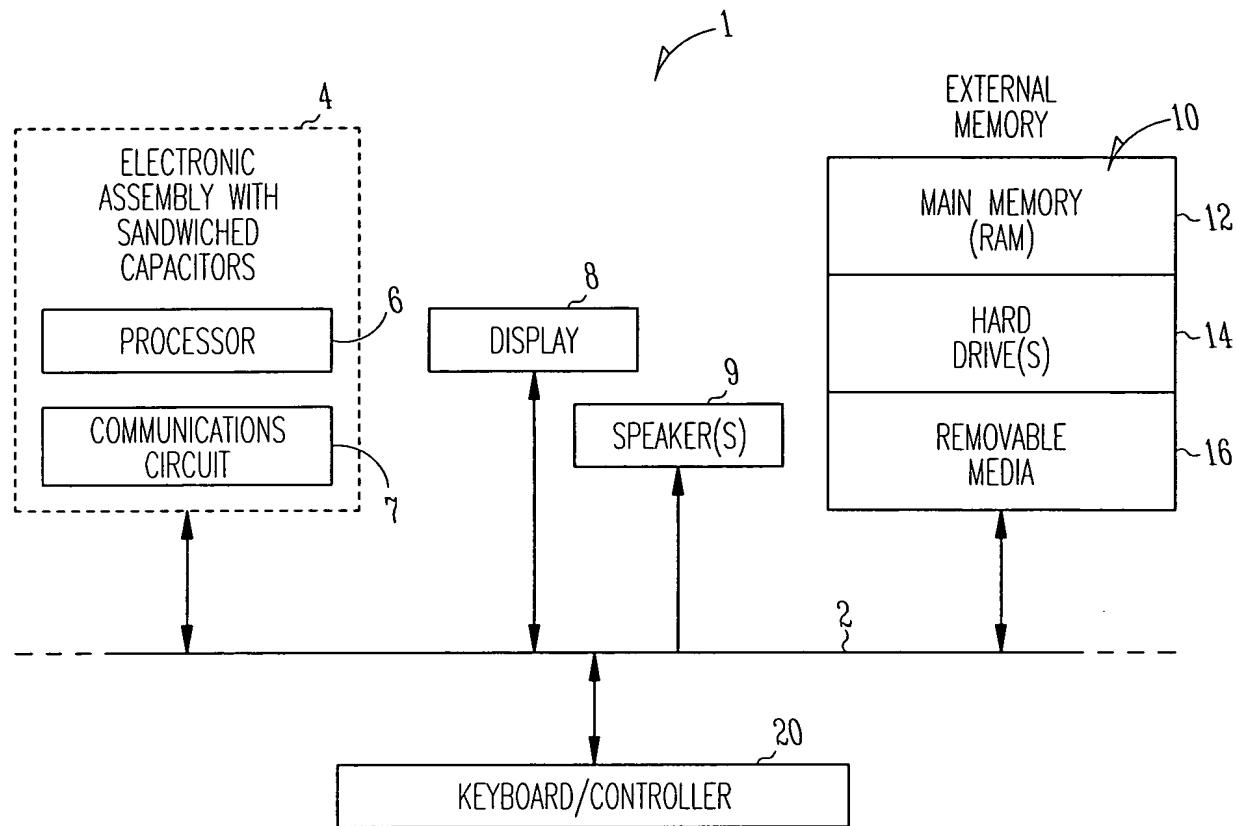


Fig. 1

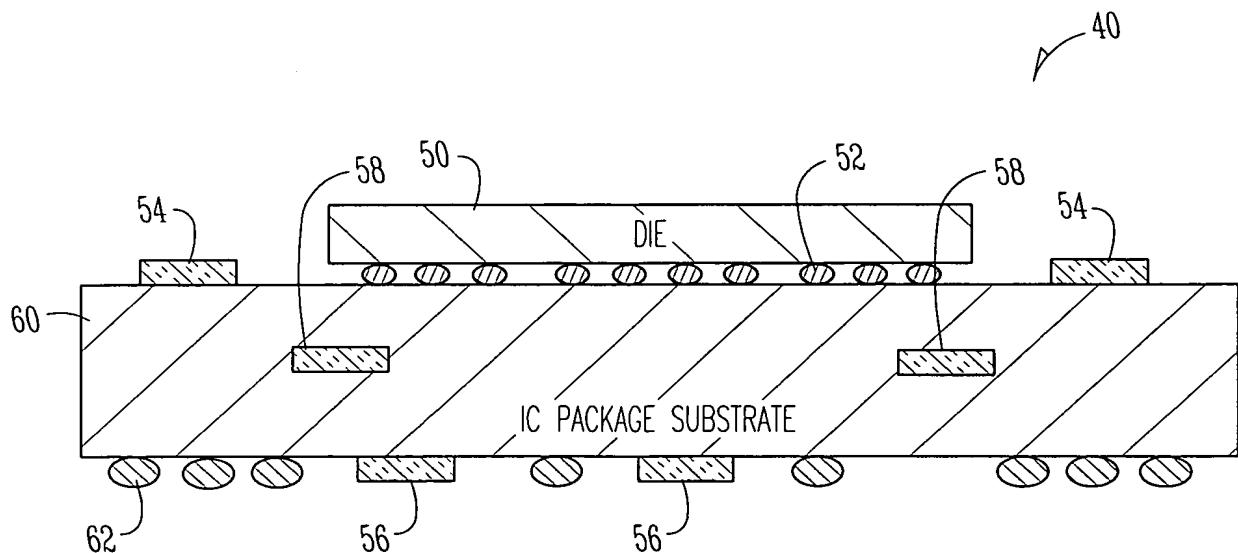


Fig. 2 (Prior Art)

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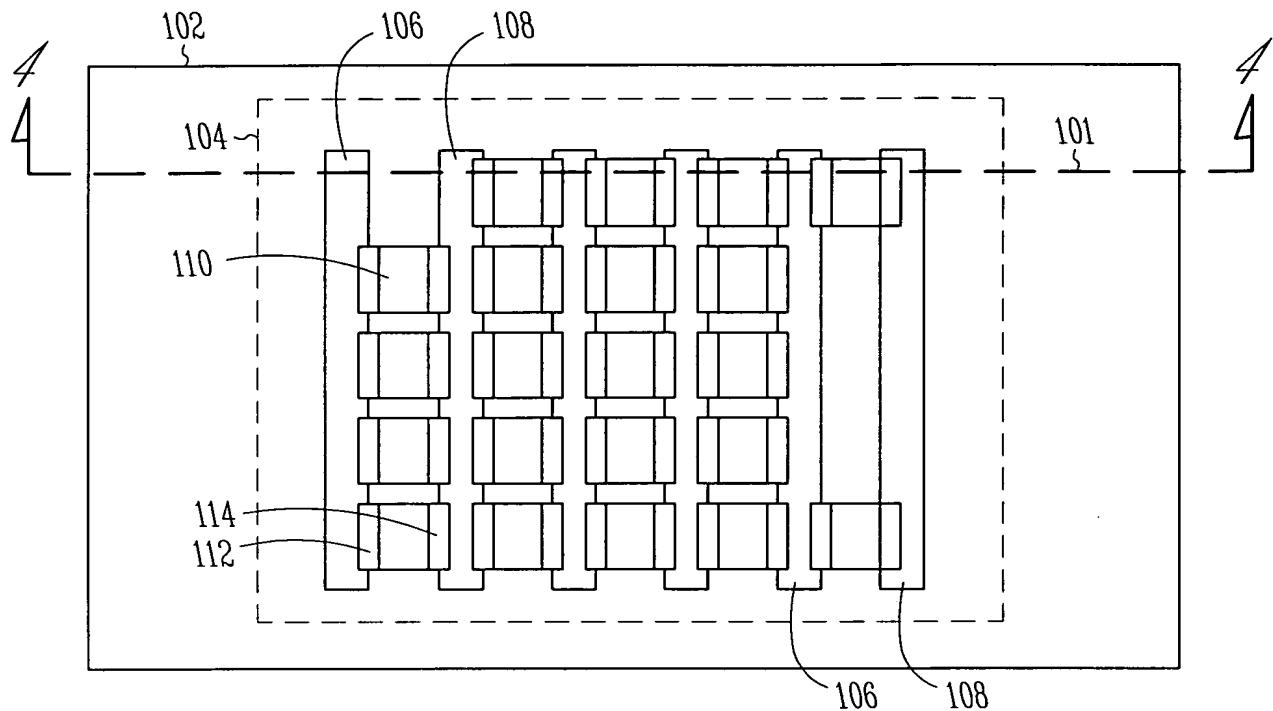


Fig. 3

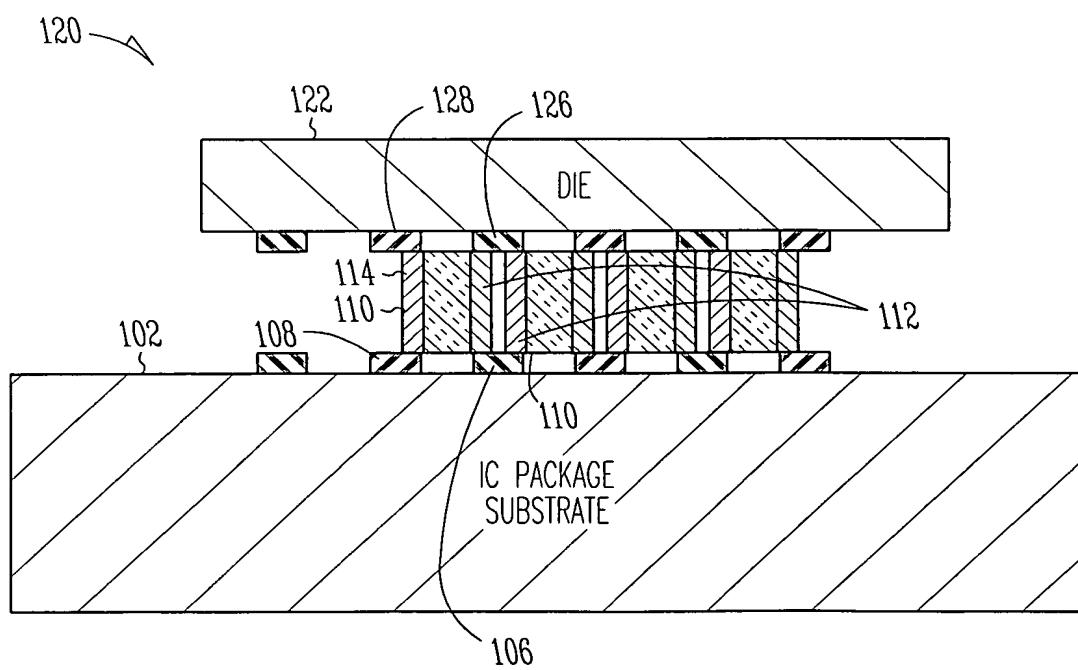


Fig. 4

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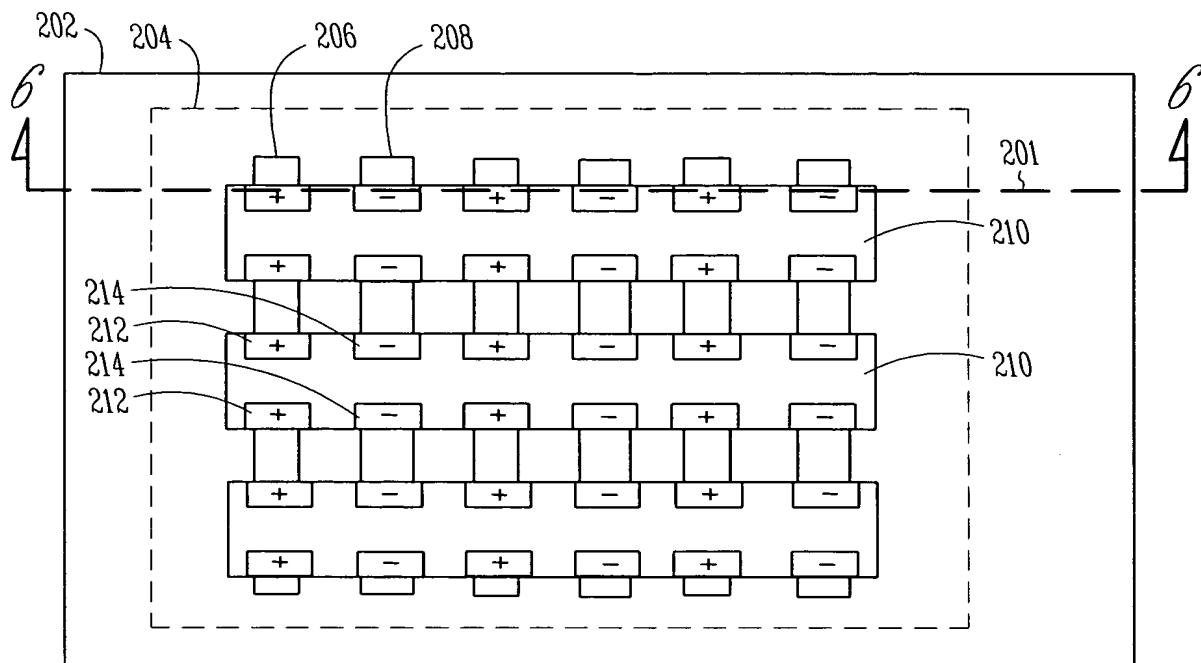


Fig. 5

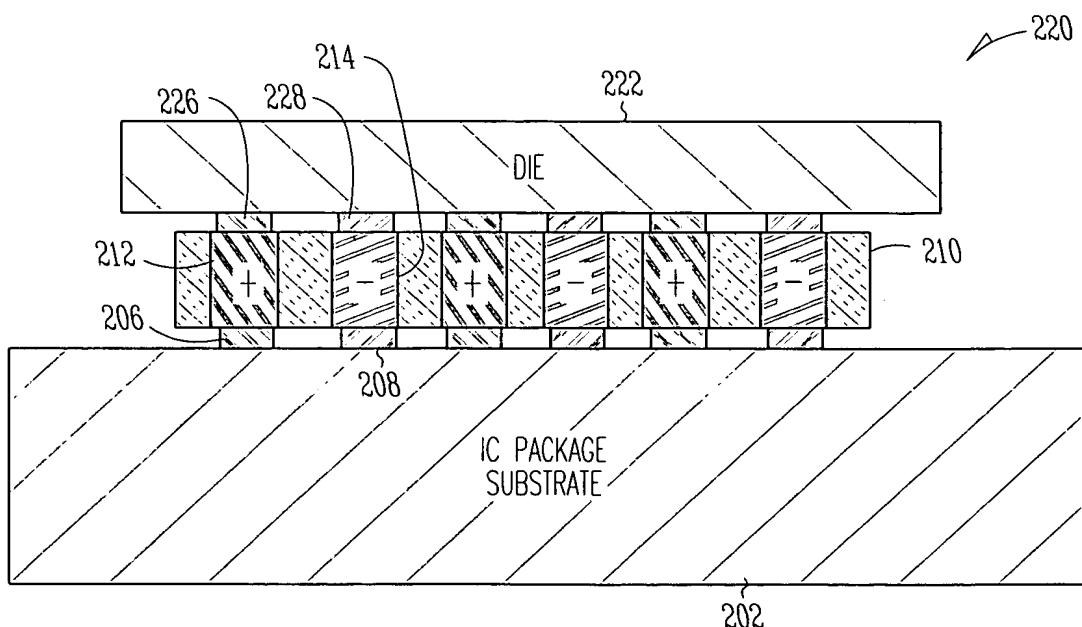


Fig. 6

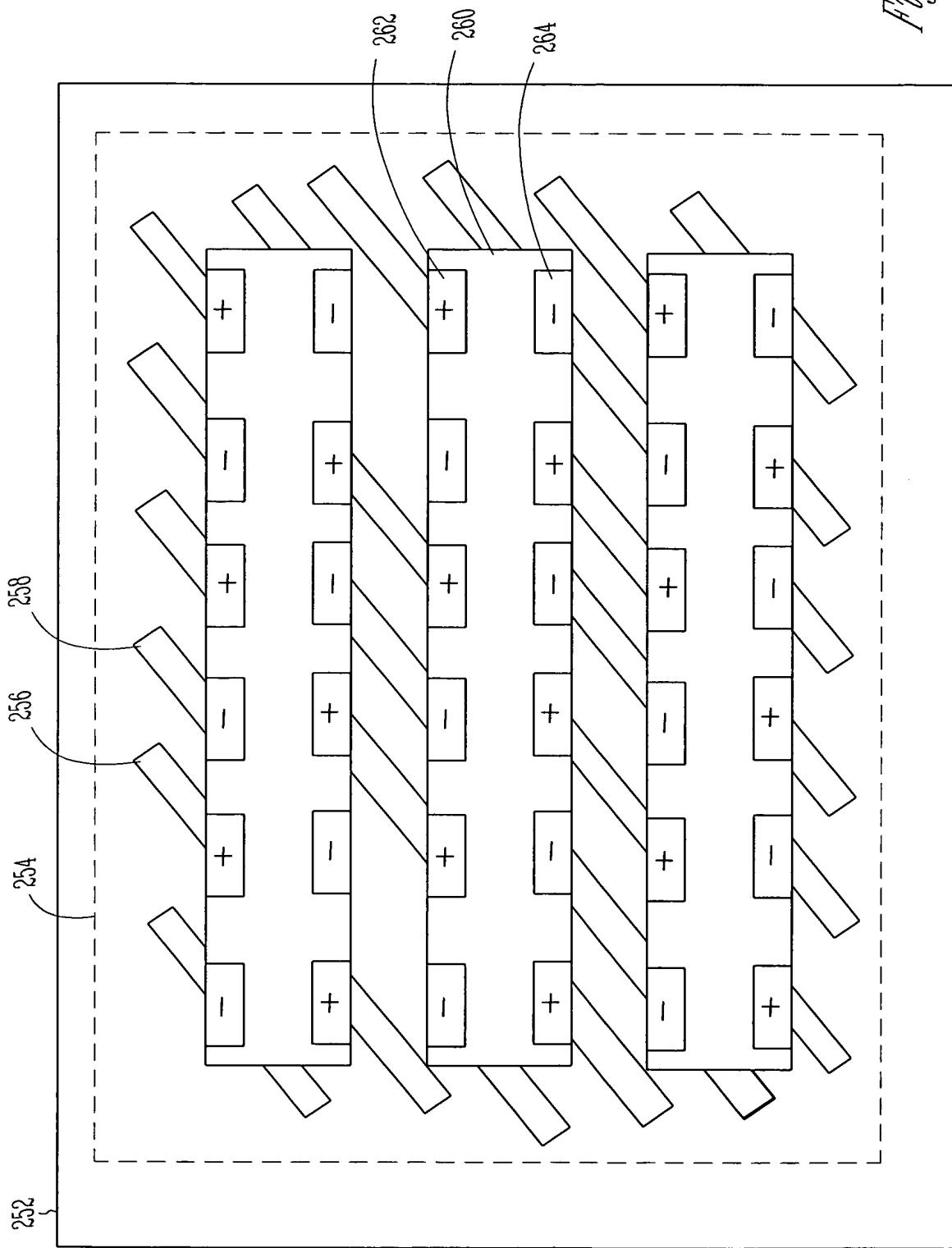
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Fig. 7



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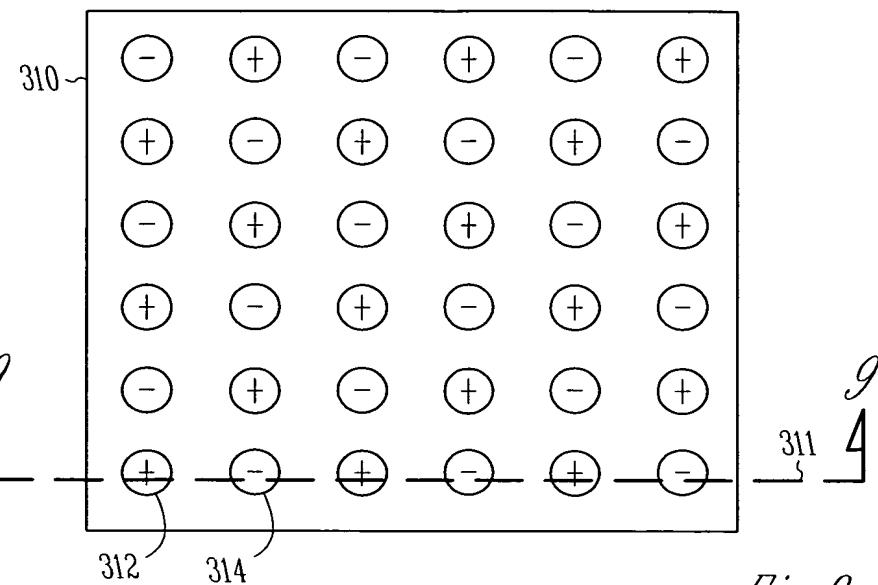


Fig. 8

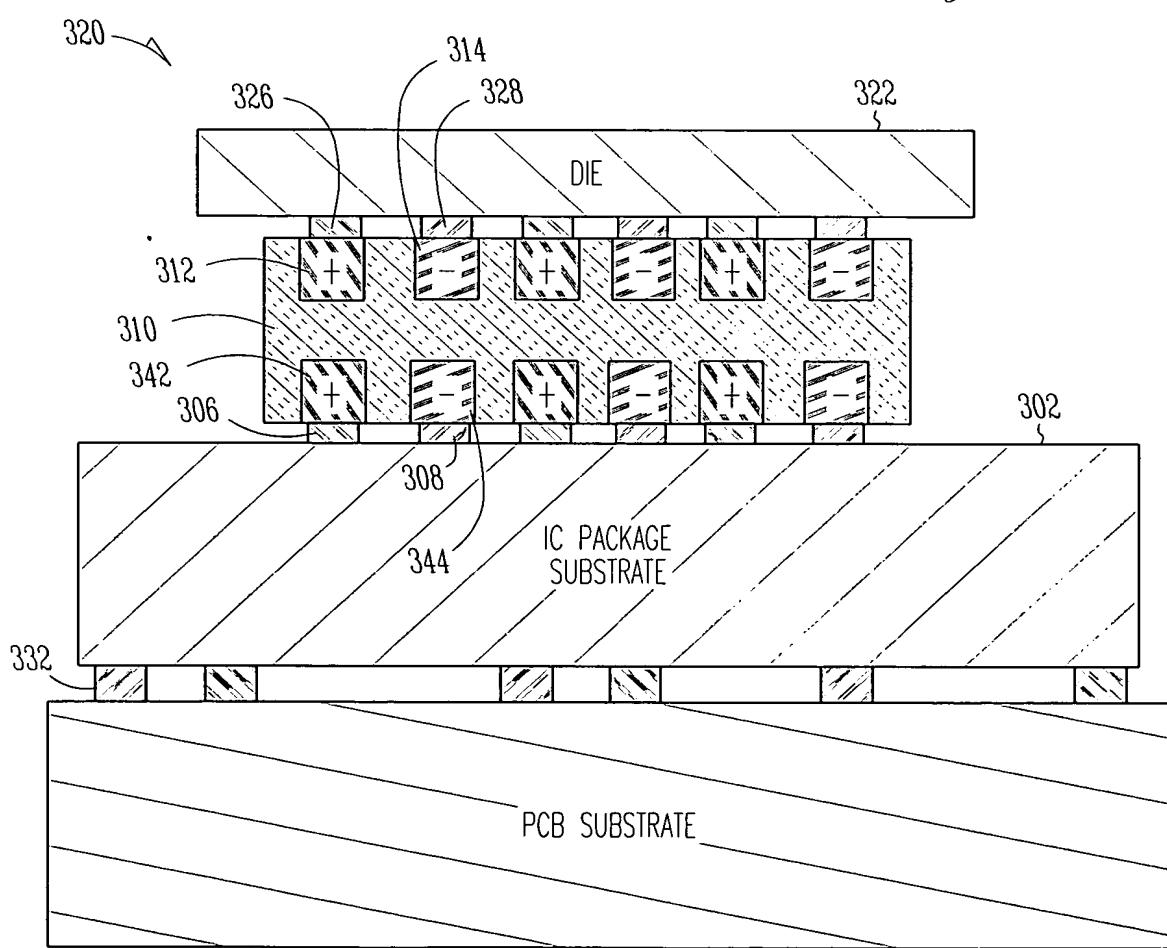


Fig. 9

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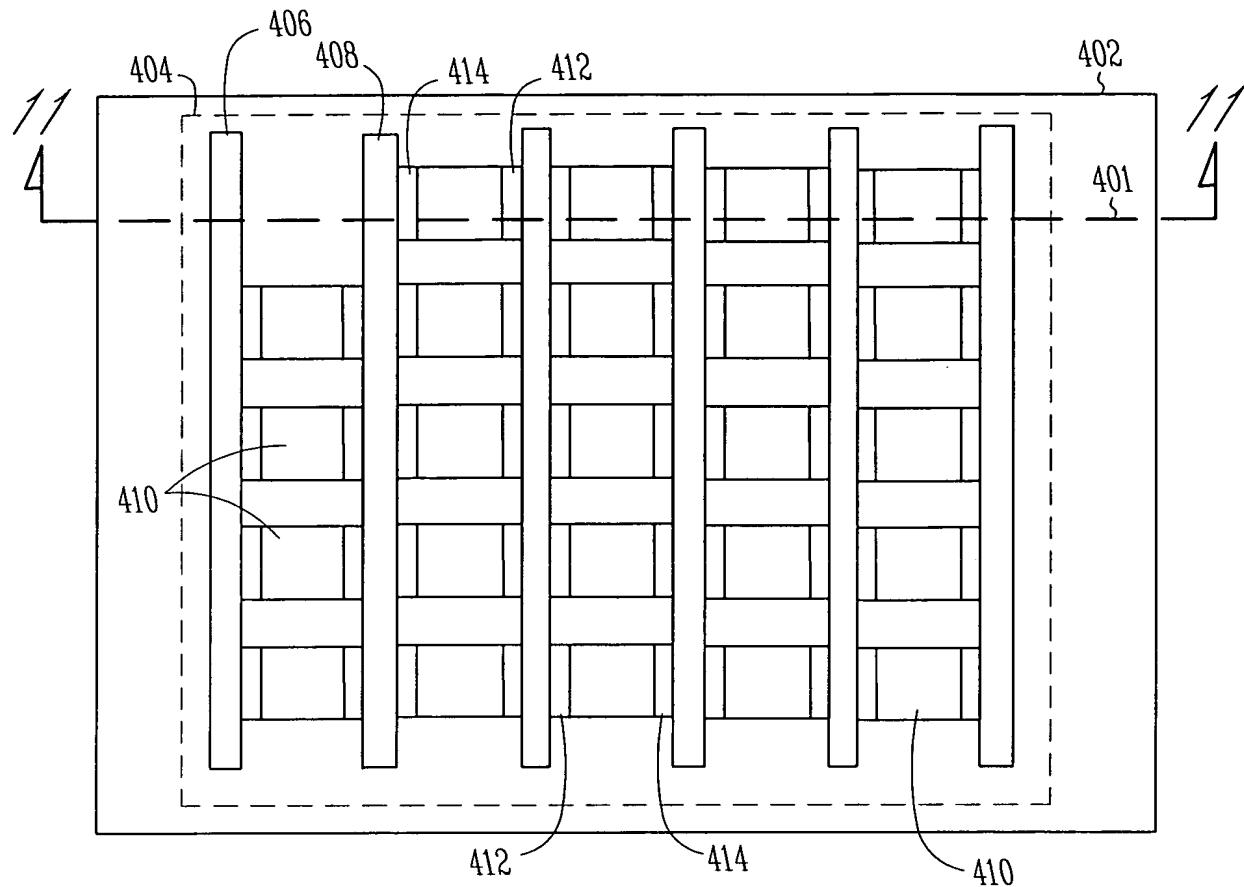


Fig. 10

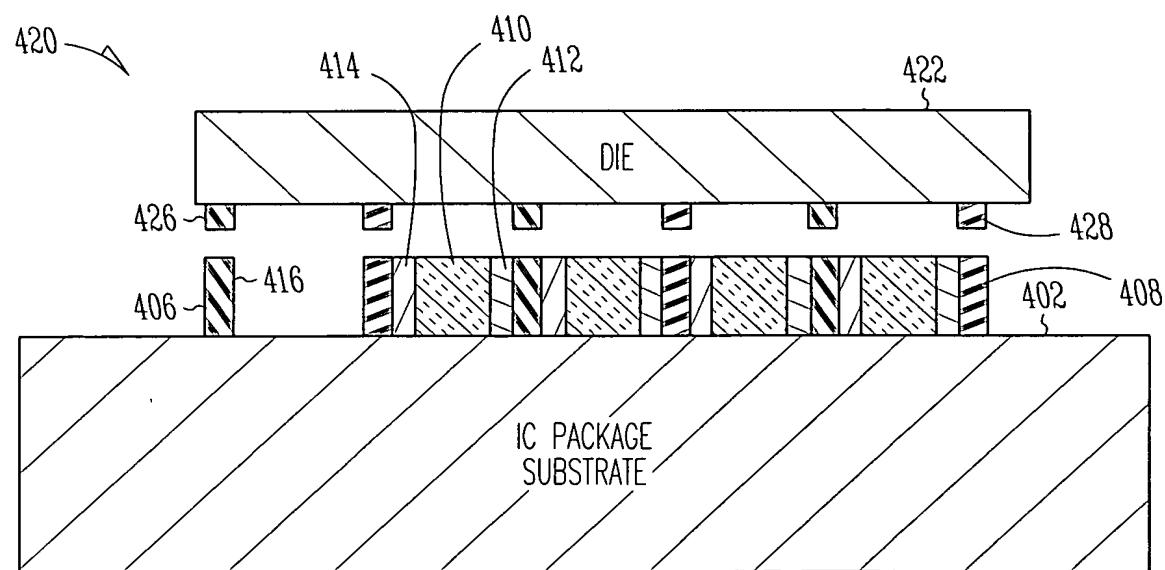


Fig. 11

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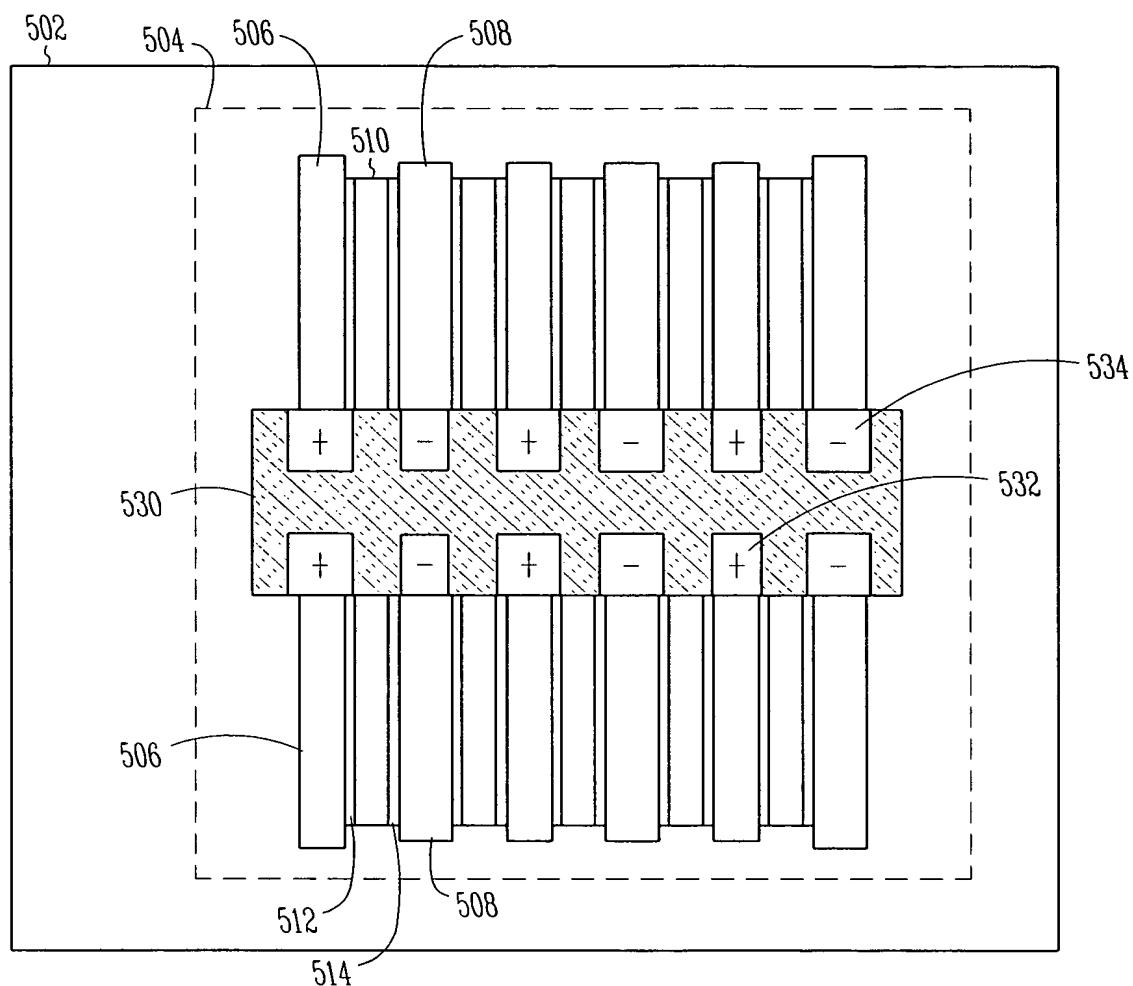


Fig. 12

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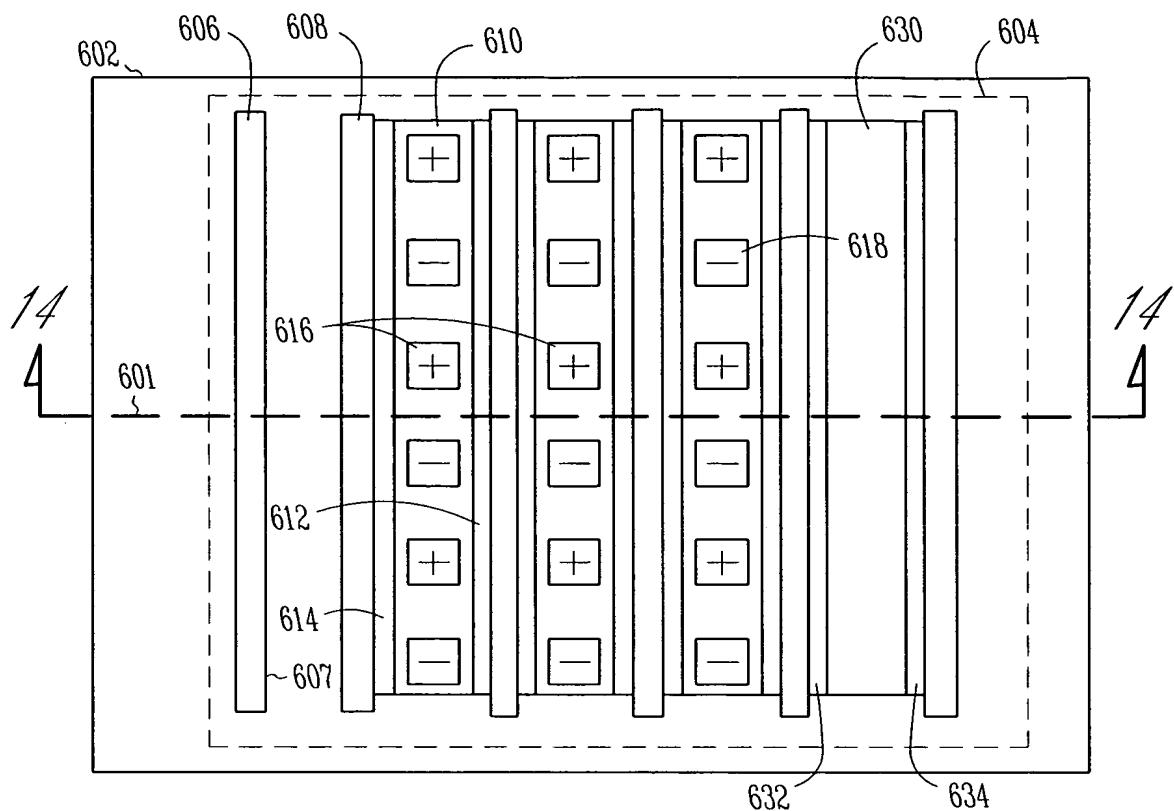


Fig. 13

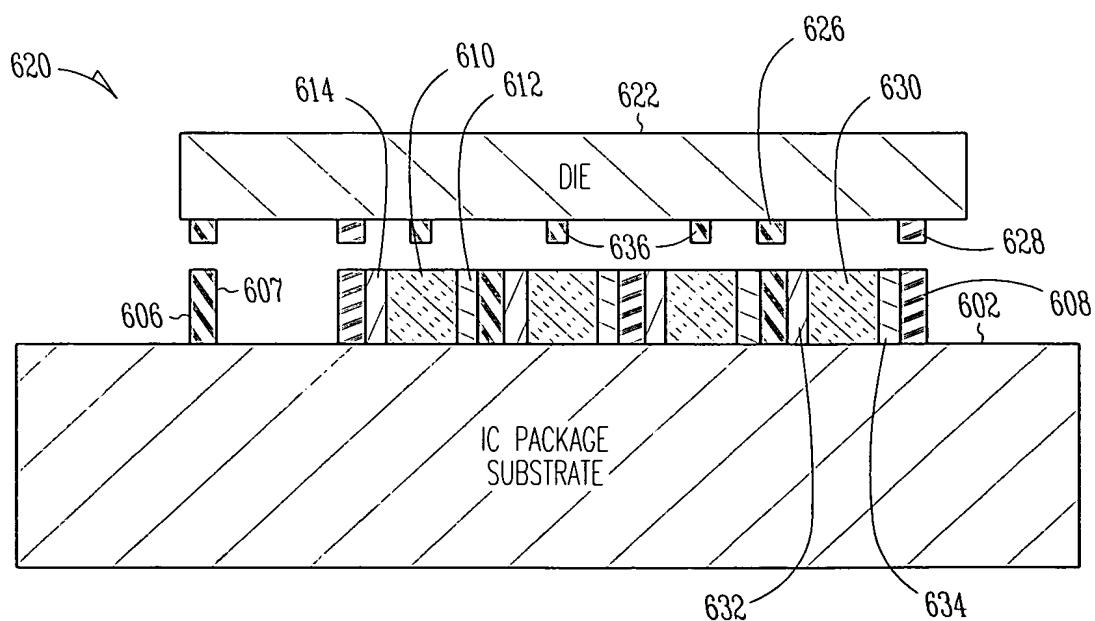


Fig. 14

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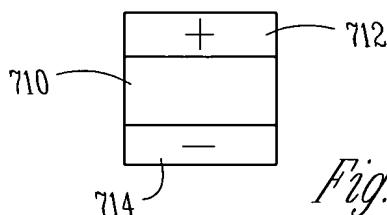


Fig. 15

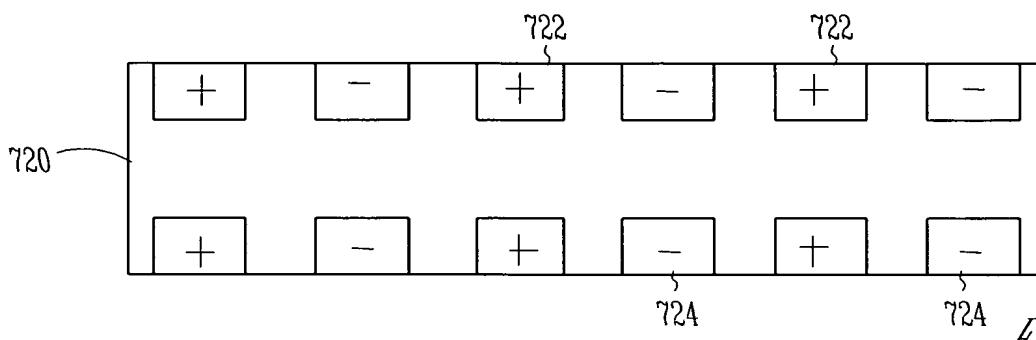


Fig. 16

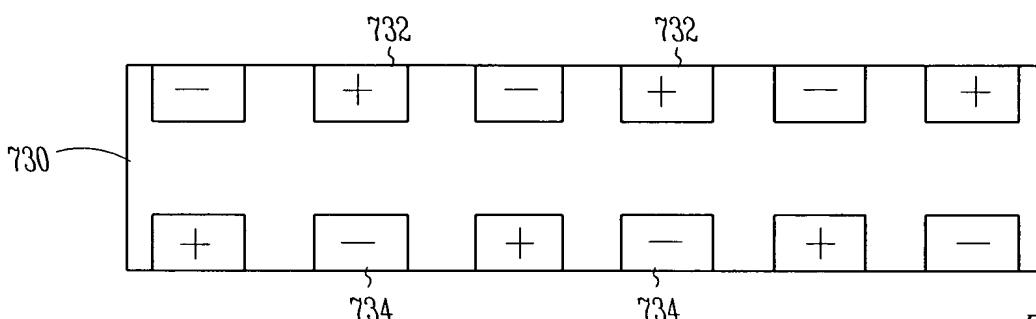


Fig. 17

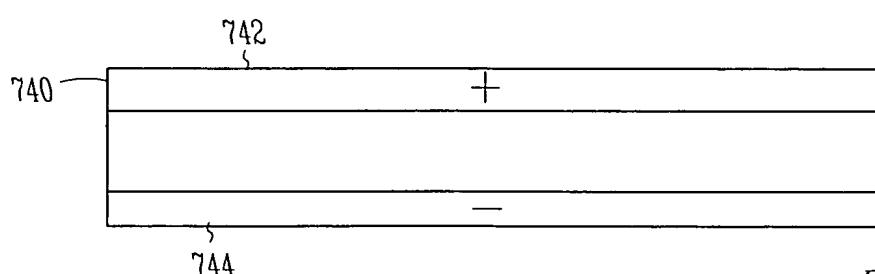


Fig. 18

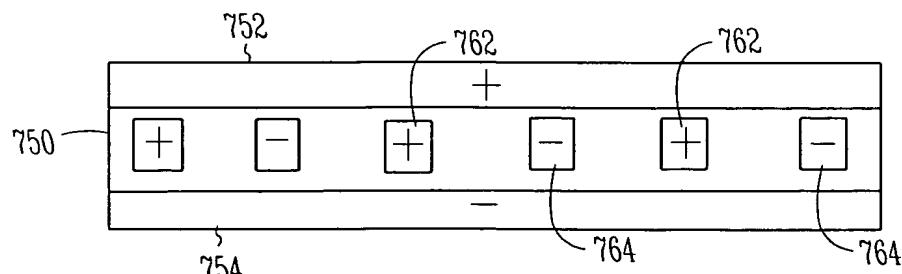


Fig. 19

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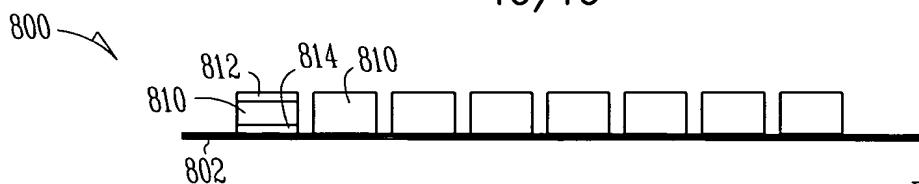


Fig.20

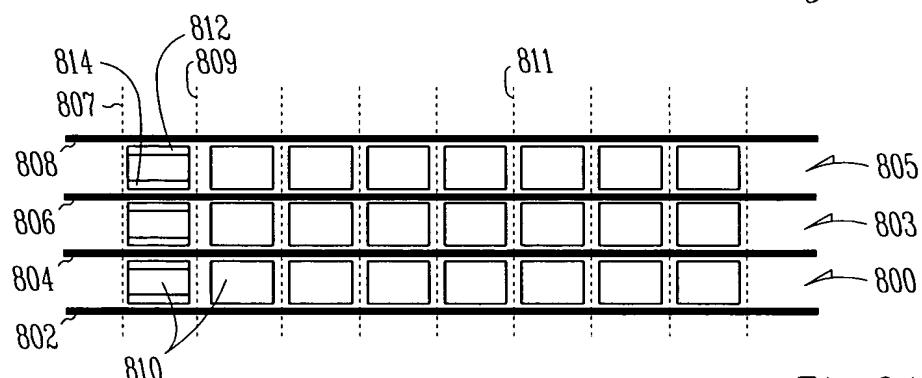


Fig.21

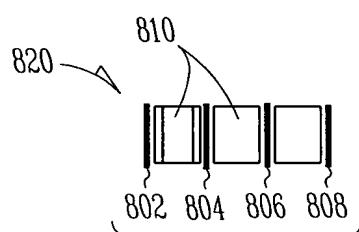


Fig.22

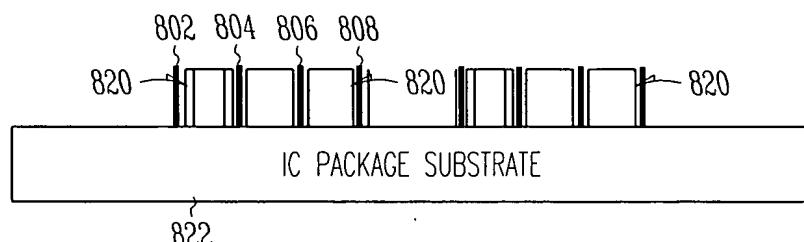


Fig.23

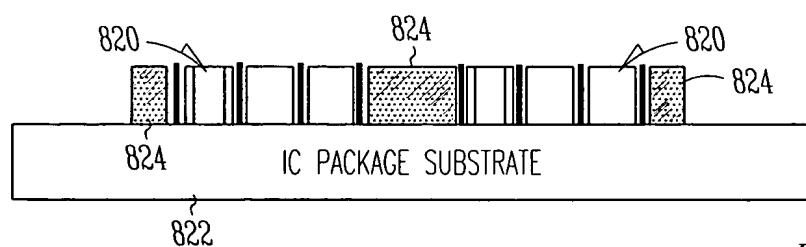


Fig.24

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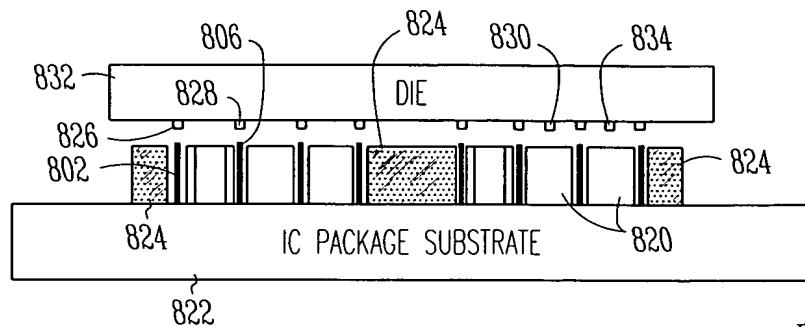


Fig. 25

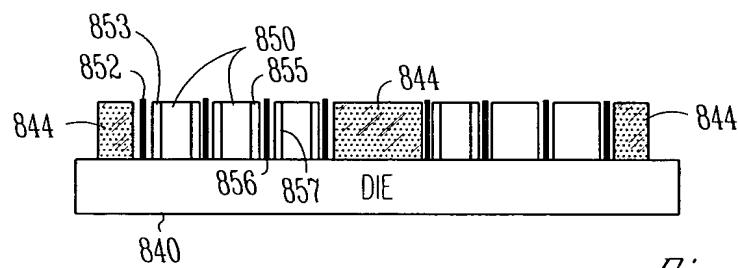


Fig. 26

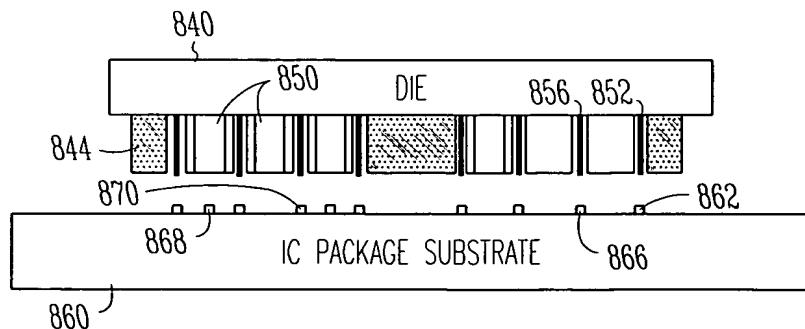


Fig. 27

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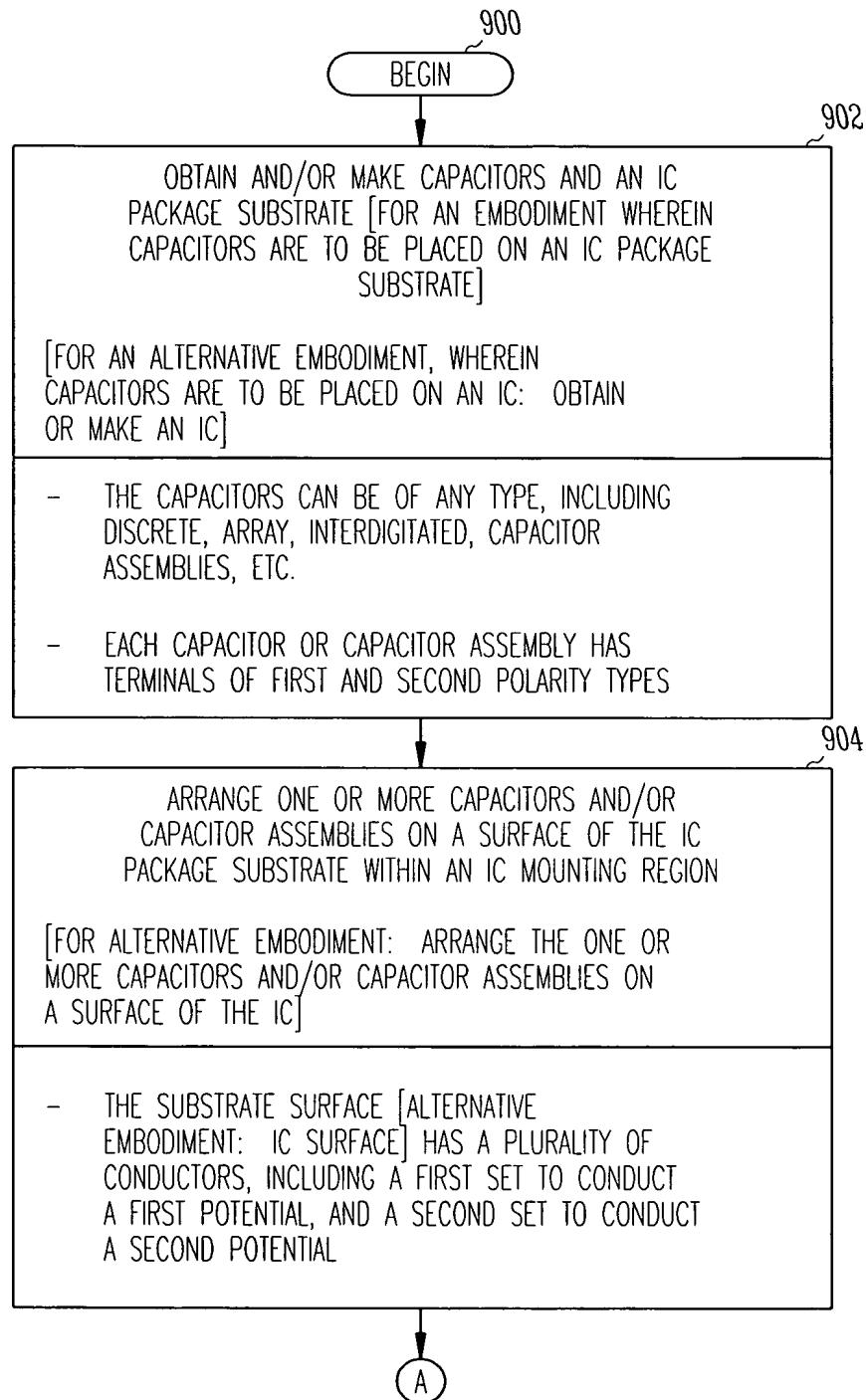


Fig. 28A

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(A)

904 CONT'D

- THE CONDUCTORS CAN BE OF ANY SUITABLE TYPE, SUCH AS SURFACE TRACES, PADS, OR BARS
- THE ONE OR MORE CAPACITORS AND/OR CAPACITOR ASSEMBLIES ARE ARRANGED SUCH THAT CERTAIN TERMINALS OF THE FIRST POLARITY TYPE CONTACT THE FIRST SET OF CONDUCTORS, AND CERTAIN TERMINALS OF THE SECOND POLARITY TYPE CONTACT THE SECOND SET OF CONDUCTORS
- IF THE IC PACKAGE SUBSTRATE SURFACE [ALTERNATIVE EMBODIMENT: IC SURFACE] HAS CONDUCTIVE BARS, ONE OR MORE OF THE CAPACITORS AND/OR CAPACITOR ASSEMBLIES IS POSITIONED BETWEEN ADJACENT ONES OF THE BARS

906

SECURE THE CAPACITORS AND/OR CAPACITOR ASSEMBLIES TO THE SUBSTRATE SURFACE [ALTERNATIVE EMBODIMENT: TO THE IC SURFACE] USING A SUITABLE MECHANISM

- E.G., APPLY A FILL OR ADHESIVE MATERIAL TO THE CAPACITORS AND/OR CAPACITOR ASSEMBLIES, AND/OR OPENINGS BETWEEN THE CAPACITORS AND/OR CAPACITOR ASSEMBLIES; USE SPACERS OR CLAMPS; ETC.

908

POSITION AND MOUNT AN IC ON THE MOUNTING REGION, E.G. USING SOLDER REFLOW

- ELECTRICALLY COUPLE THE IC TERMINALS TO CORRESPONDING TERMINALS OF THE ONE OR MORE CAPACITORS AND/OR CAPACITOR ASSEMBLIES, AND OPTIONALLY TO CONDUCTORS ON THE SUBSTRATE

(B)

Fig. 28B

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908 CONT'D

- IF THE IC PACKAGE SUBSTRATE SURFACE HAS CONDUCTIVE BARS, ONE OR MORE OF THE CAPACITORS AND/OR CAPACITOR ASSEMBLIES CAN BE ELECTRICALLY COUPLED TO ONE OR MORE BARS, TO THE IC, OR TO ONE OR MORE BARS AND TO THE IC

[FOR ALTERNATIVE EMBODIMENT: POSITION AND MOUNT THE IC ON A MOUNTING REGION OF AN IC PACKAGE SUBSTRATE, E.G. USING SOLDER REFLOW]

- [ALTERNATIVE EMBODIMENT: ELECTRICALLY COUPLE THE IC PACKAGE SUBSTRATE TERMINALS TO CORRESPONDING TERMINALS OF THE ONE OR MORE CAPACITORS AND/OR CAPACITOR ASSEMBLIES, AND OPTIONALLY TO CONDUCTORS ON THE IC]
- [ALTERNATIVE EMBODIMENT: IF THE IC SURFACE HAS CONDUCTIVE BARS, ONE OR MORE OF THE CAPACITORS AND/OR CAPACITOR ASSEMBLIES CAN BE ELECTRICALLY COUPLED TO ONE OR MORE BARS, TO THE IC PACKAGE SUBSTRATE, OR TO ONE OR MORE BARS AND TO THE IC PACKAGE SUBSTRATE]

910

END

Fig. 28C

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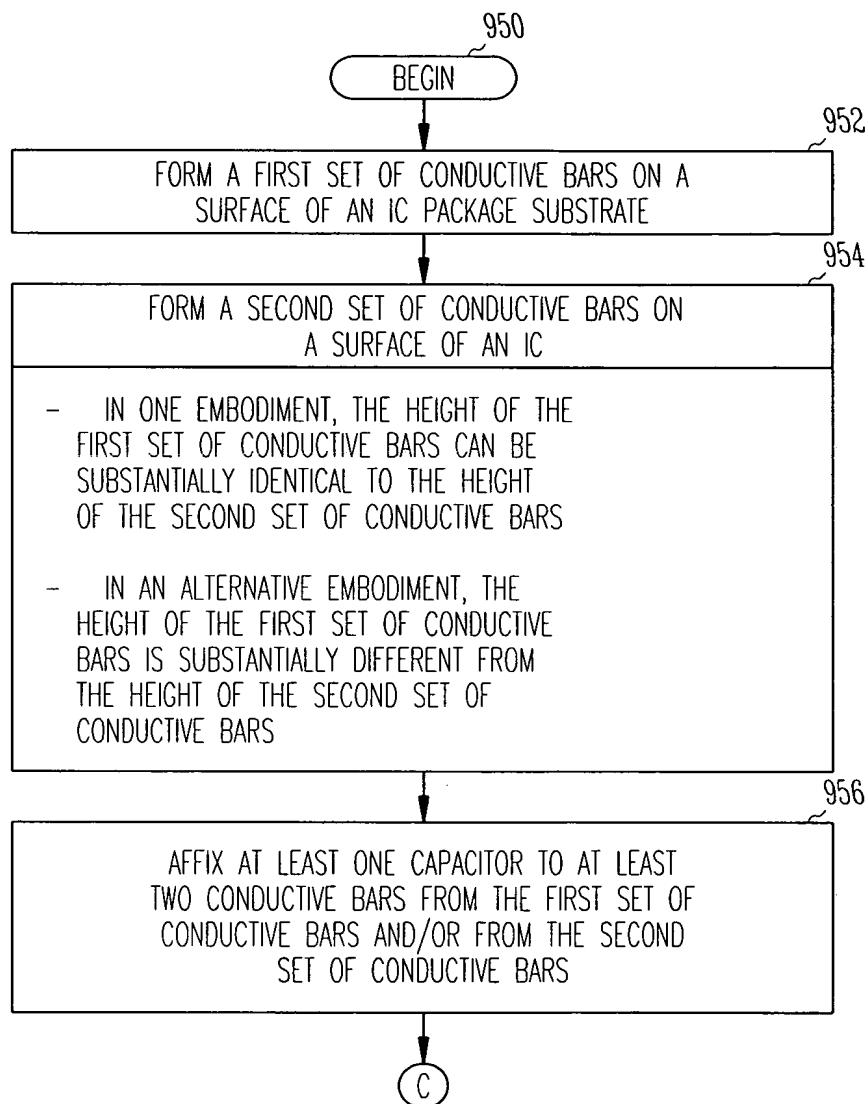


Fig. 29A

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(C)

958

MOUNT THE IC ON AN IC MOUNTING REGION OF
THE IC PACKAGE SUBSTRATE

- FOR THE ONE EMBODIMENT: CONDUCTIVE BARS FROM THE FIRST SET AND SECOND SETS TOGETHER MAKE UP THE REQUIRED NUMBER OF CONDUCTIVE BARS
- FOR THE ALTERNATIVE EMBODIMENT: CONDUCTIVE BARS FROM THE FIRST SET OF CONDUCTIVE BARS ARE JOINED TO CONDUCTIVE BARS FROM THE SECOND SET OF CONDUCTIVE BARS TO FORM CONDUCTIVE BARS HAVING A FINAL DESIRED HEIGHT

960

END

Fig.29B